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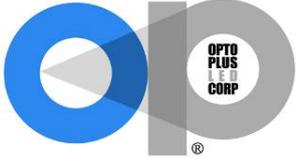
**Opto Plus LED Corp.**  
**0.20" SMD Type LED Display**  
**OPS-Q2012SPG | OPS-Q2013SPG**

● **EDIT HISTORY**

Version A: Nov. 11, 2020

Preliminary Spec.

Confidential Document



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# Opto Plus LED Corp.

## 0.20" SMD Type LED Display

### OPS-Q2012SPG | OPS-Q2013SPG

#### ● FEATURES

- 0.20 inch (5.08 mm) Digit Height.
- SMD type.
- Low current operation.
- RoHS Compliant, Pb Free.

#### ● DESCRIPTION

The device are 0.20 inch (5.08 mm) height quadruple digit 7-segment displays.

The device is Opto Plus LED Corp standard LED Display.

This device utilizes Pure Green LED chip which are made from InGaN on a Transparent GaN, substrate.

The device has face and segment option, please refer to **PRODUCT APPEARANCE**.

#### ● DEVICE

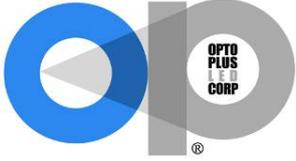
PART NO.	DESCRIPTION
OPS-Q2012SPG-GW	Common Anode   Gray face   White segment
OPS-Q2013SPG-GW	Common Cathode   Gray face   White segment
OPS-Q2012SPG-BW	Common Anode   Black face   White segment
OPS-Q2013SPG-BW	Common Cathode   Black face   White segment

**RoHS Compliance**



**Pb Free.**





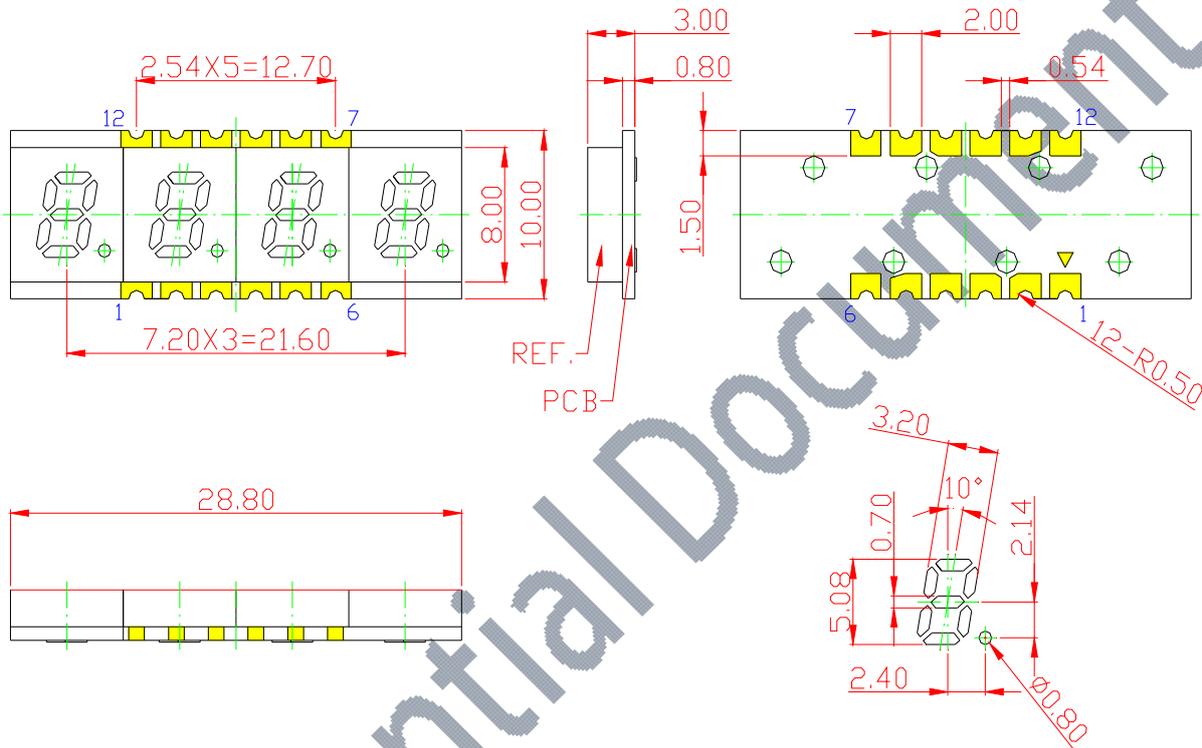
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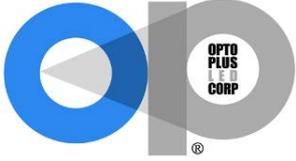
## 0.20" SMD Type LED Display

### OPS-Q2012SPG | OPS-Q2013SPG

#### ● MECHANICAL DIMENSIONS



NOTES: All dimensions are in millimeters. Tolerances are  $\pm 0.25$  mm unless otherwise noted.



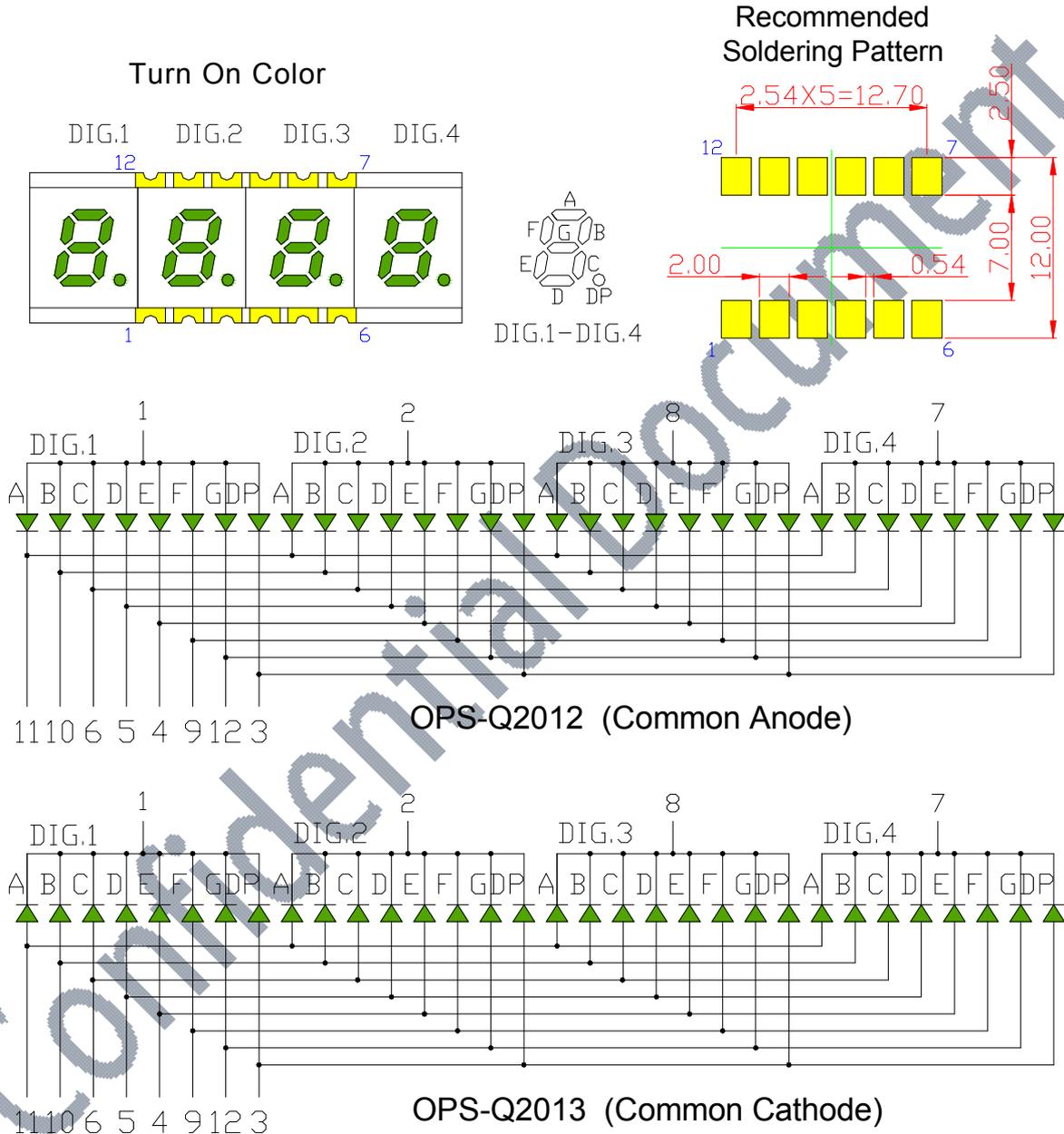
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## 0.20" SMD Type LED Display

### OPS-Q2012SPG | OPS-Q2013SPG

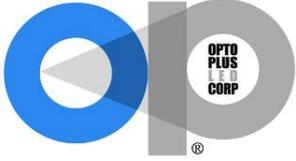
#### ● TYPICAL INTERNAL EQUIVALENT CIRCUIT



※EMITTED COLOR : PURE GREEN

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Disclaimer:  
 Subject to change without notice



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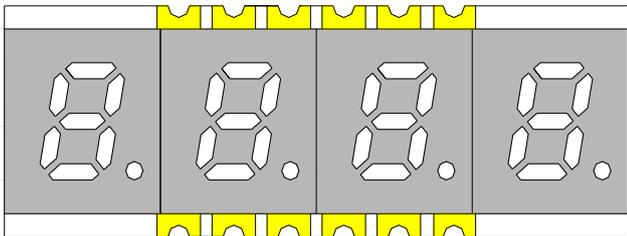
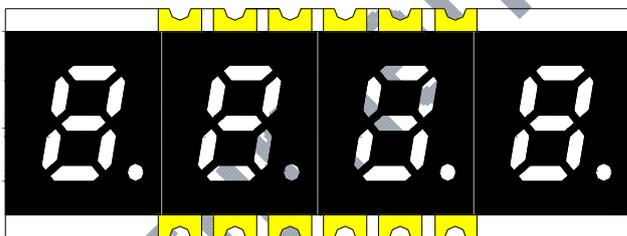
# Opto Plus LED Corp.

## 0.20'' SMD Type LED Display

### OPS-Q2012SPG | OPS-Q2013SPG

#### ● PRODUCT APPEARANCE

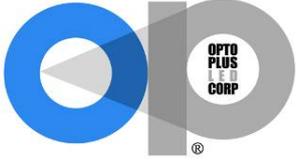
The most common reflector color and segment color are show in below diagram.

-GW	-BW
	
※ REFLECTOR COLOR: Gray ※ SEGMENT COLOR: White	※ REFLECTOR COLOR: Black ※ SEGMENT COLOR: White

Opto Plus can customize reflector and segment colors by customer's request. If you have these request please visit [www.opledtw.com](http://www.opledtw.com) or contact [sales@opledtw.com](mailto:sales@opledtw.com) for more **Standard Product Customization** information.

Part NO. related to reflector and segment colors show as table below.

PART NO.	DESCRIPTION
OPS-Q2012SPG-GW	Common Anode   Gray face   White segment
OPS-Q2013SPG-GW	Common Cathode   Gray face   White segment
OPS-Q2012SPG-BW	Common Anode   Black face   White segment
OPS-Q2013SPG-BW	Common Cathode   Black face   White segment



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## Opto Plus LED Corp. 0.20" SMD Type LED Display OPS-Q2012SPG | OPS-Q2013SPG

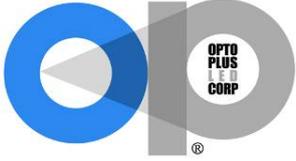
### ● SPG: PURE GREEN (InGaN/GaN)

ABSOLUTE MAXIMUM RATING AT Ta=25°C

Parameter	Symbol	Maximum Rating	Unit
Power dissipation	P <sub>AD</sub>	90	mW
Continuous forward current	I <sub>AF</sub>	30	mA
Peak current (duty cycle 1/10, 1kHz)	I <sub>PF</sub>	60	mA
Reverse voltage	V <sub>R</sub>	5	V
Operating temperature	T <sub>OPR</sub>	-40 to +105	°C
Storage temperature	T <sub>STG</sub>	-40 to +105	°C

ELECTRICAL - OPTICAL CHARACTERISTICS AT Ta=25°C

Characteristic	Symbol	Condition	Min.	Type.	Max	Unit
Forward Voltage, (Per Dice)	V <sub>F</sub>	I <sub>F</sub> = 20mA	-	3.0	3.4	V
Reverse Current, (Per Dice)	I <sub>R</sub>	V <sub>R</sub> = 5V	-	-	10	μA
Dominant Wavelength	λ <sub>D</sub>	I <sub>F</sub> = 20mA	515	-	530	nm
Luminous Intensity	I <sub>v</sub>	I <sub>F</sub> = 20mA	130	205	280	mcd
Spectral Line Half-Bandwidth	Δλ	I <sub>F</sub> = 20mA	-	30	-	nm



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● **SPG: BIN GRADE (Unit : mcd ) 20mA**

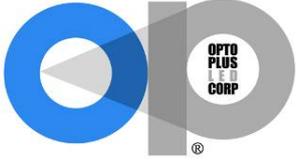
PURE GREEN	<b>R</b>	<b>S</b>	<b>T</b>
	130.0 – 180.0	180.1 – 230.0	230.1 – 280.0

● **SPG: HUE GRADE ( $\lambda_D$  : nm)**

<b>1</b>	<b>2</b>	<b>3</b>
515.0 – 520.0	520.1 – 525.0	525.1 – 530.0

● **AVAILABLE BIN / HUE TABLE**

R1	R2	R3
S1	S2	S3
T1	T2	T3



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# Opto Plus LED Corp.

## 0.20" SMD Type LED Display

### OPS-Q2012SPG | OPS-Q2013SPG

#### ● SPG: PURE GREEN (InGaN/GaN) CURVE

Typical Electro-optical Characteristic Curves  
(25 °C Free Air Temperature Unless Otherwise Specified)

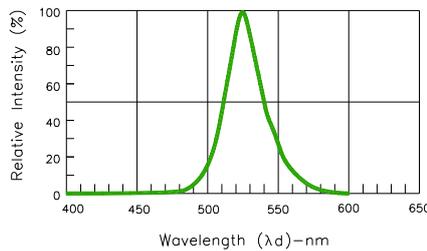


Fig.-1 Relative Intensity VS. Wavelength

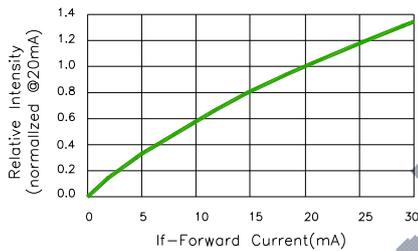


Fig.2-Relative Luminous Intensity vs. Forward Current

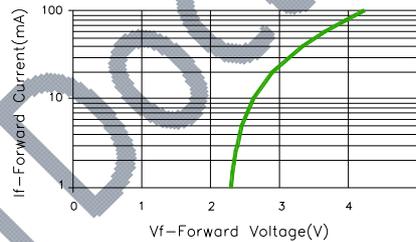


Fig.3-Forward Current vs. Forward Voltage

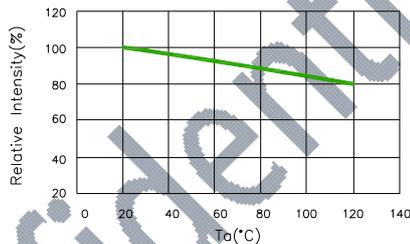


Fig.4-Relative Intensity(@20mA)VS. Ambient Temperature

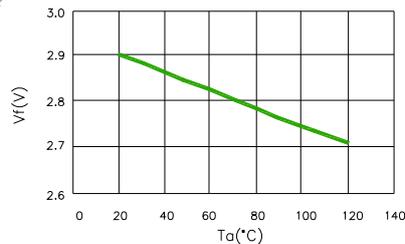


Fig.5-Forward Voltage(@20mA)VS. Ambient Temperature



Fig.6-Dominant Wavelength(@20mA)  
VS. Ambient Temperature

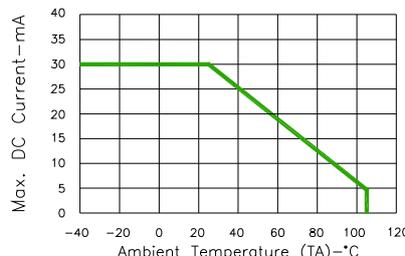
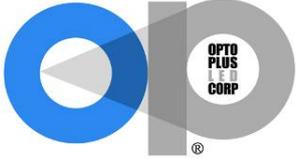


Fig.7-Max. Allowable DC Current  
VS. Ambient Temperature



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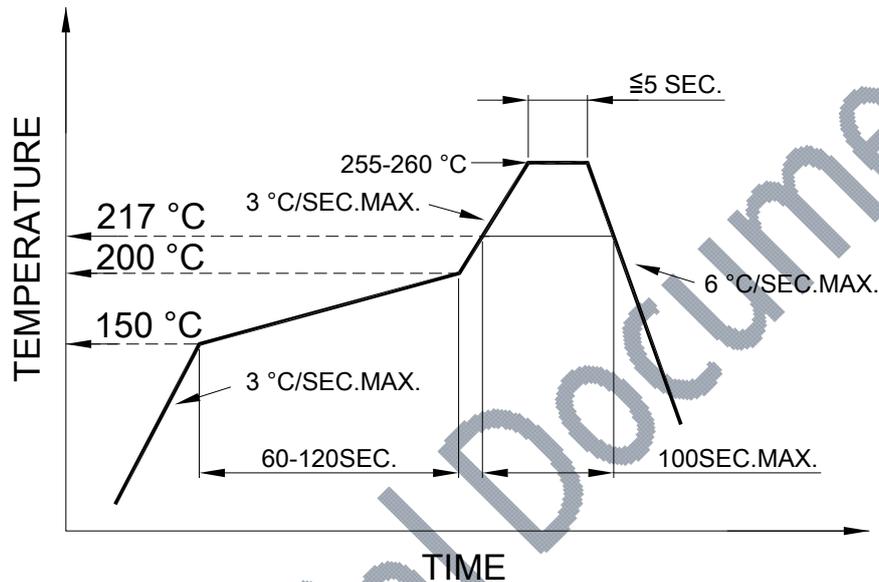
## 0.20" SMD Type LED Display

### OPS-Q2012SPG | OPS-Q2013SPG

#### ● SMT REFLOW SOLDERING INSTRUCTIONS

SMT Soldering Profile

Pb free reflow soldering Profile



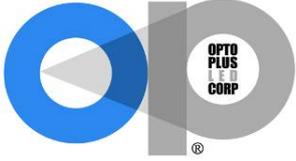
- We recommend the reflow temperature 245°C (+/- 5°C).  
The maximum soldering temperature should be limited to 260°C.
- Number of reflow process shall be 2 times or less.

#### ● SOLDERING IRON

Basic spec is  $\leq 4$  sec when 260°C. If temperature is higher, time should be shorter (+10°C → 1 sec). Power dissipation of Iron should be smaller than 15W, and temperature should be controllable. Surface temperature of the device should be under 230°C.

#### ● REWORK

- Customer must finish rework within 3 sec. under 350°C.
- The head of soldering iron cannot touch copper foil.



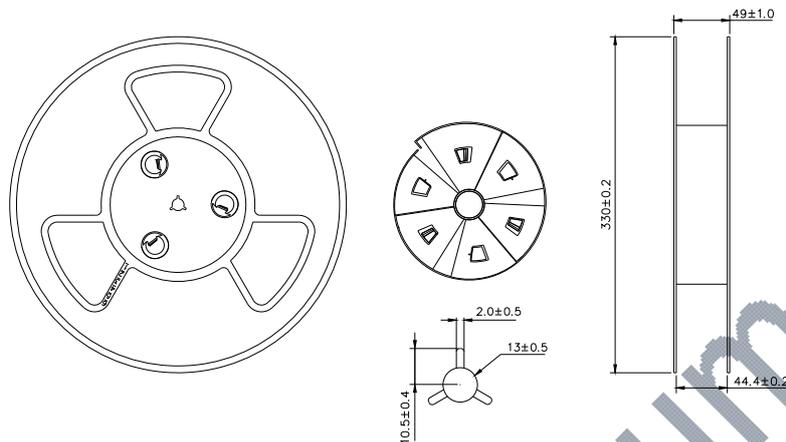
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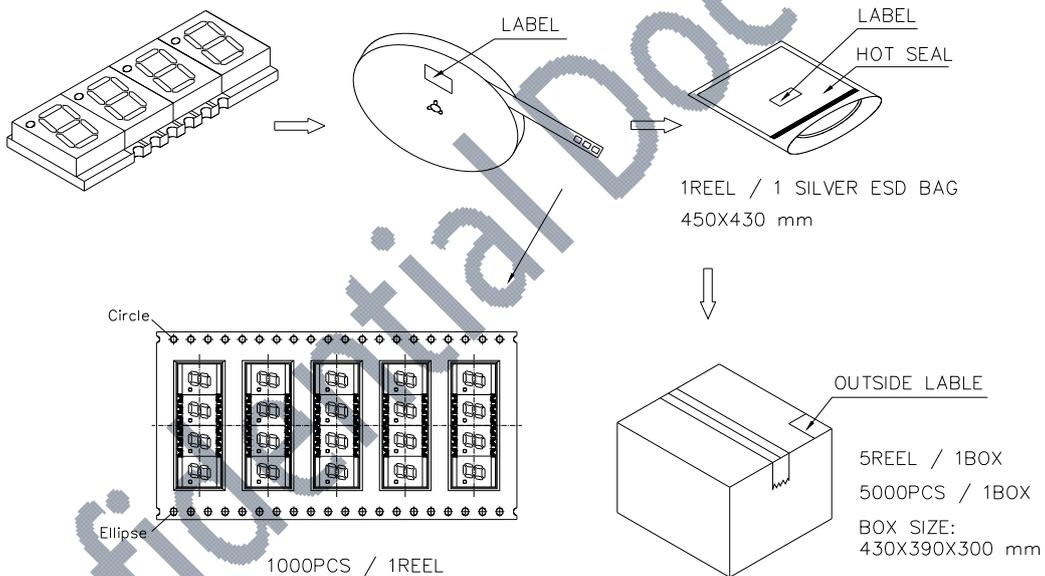
## 0.20" SMD Type LED Display

### OPS-Q2012SPG | OPS-Q2013SPG

#### ● REEL DIMENSIONS



#### ● PACKING & LABEL SPECIFICATIONS



#### ● STORAGE CONDITION

In factory original sealed bag package

TEMPERATURE CONDITION	HUMIDITY CONDITION
5°C ~ 30°C	Below 60%RH

After opened and not in factory original sealed bag package

TEMPERATURE CONDITION	HUMIDITY CONDITION	STORAGE TIME
5°C ~ 30°C	Below 60%RH	Within 4 weeks (MSL as level 2a)